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TRAINING OBJECTIVES

At the end of this module, you will be able to:

1. Define a fertilizer and terms associated with fertilizers.
2. Interpret and apply the information on a fertilizer label.
3. Calculate the amount of fertilizer to be applied according to the recommended rates.
4. Implement practices to avoid runoff and leaching of fertilizers.
5. Explain how to properly store fertilizer and clean up spills.

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Florida-Friendly Landscaping™ GI-BMP PROGRAM

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SLOW- OR CONTROLLED-RELEASE

Release mechanisms include:

- Microbial action
- Hydrolysis
- Temperature
- Osmotic diffusion

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NITROGEN (N)

NITROGEN IS ESSENTIAL TO PLANT LIFE

If inappropriately applied, it can alter or degrade the environment.

- Turf requires N during times of active growth.
- Found in proteins, chlorophyll and enzymes.
- Highly mobile in sandy soils (NO₃)
- Regulates plant growth and development.

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Form	Quick or Soluble	Slow or Controlled
Organic	Urea (synthetic)	Bio-Solids
Inorganic	Ammonium nitrate Ammonium sulfate Ammonium phosphate	Urea types: Sulfur coated (SCU) Polymer sulfur coated (PCU) Formaldehyde products Ureaform Materials Methylene Methylenediurea Dimethylenetriurea Triazone

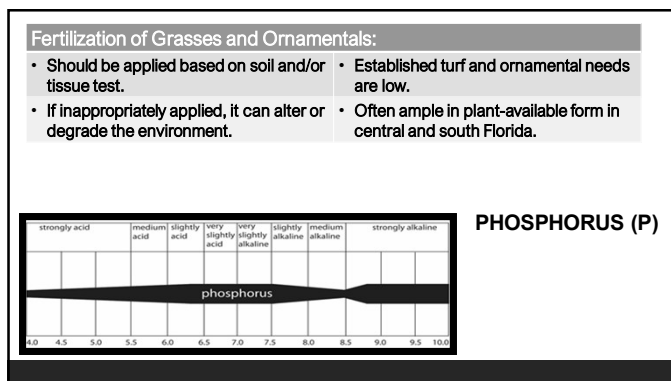
NITROGEN SOURCES

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Quick or Soluble	Slow-Released
<ul style="list-style-type: none"> Typically have about a 30-day response period. Readily dissolvable in water and are often applied dissolved in water through a sprayer. May also be applied in granular form. 	<ul style="list-style-type: none"> Release Nitrogen at a rate more consistent with plant's needs. Usually more expensive than soluble fertilizers. More efficient use of Nitrogen. Extend availability.

NITROGEN SOURCES

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FDACS PHOSPHORUS RULE

FDACS Fertilizer Rule limits use:

0.25 LB 1,000 FT² PER APPLICATION 0.5 LB 1,000 FT² ANNUALLY

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Potassium is similar to a "multi-vitamin" for turf/ornamental plants

- Improve drought/cold tolerances and disease resistance.
- Aids in producing a deep root system and plant resiliency.
- Mobile in sandy soils, but not a pollutant.
- N:K ratios: 2:1 or 1:1

POTASSIUM (K)

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- A magnesium deficiency may be found in many parts of the state.
- Helps activate many plant enzymes needed for growth.
- May affect landscape plants and palms.
- Soil application treatment to deficient palms provides effective, long-term results.

MAGNESIUM (Mg)

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- Greening response using Fe and/or Mn most likely on soils having a pH above 7.
- Limited pH availability.
- Essential for chlorophyll, but not a substitute for nitrogen.
- In high pH soils, apply as chelated or sulfate source as a foliar treatment.

strongly acid	medium acid	slightly acid	very slightly acid	very slightly alkaline	slightly alkaline	medium alkaline	strongly alkaline					
iron												
4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0

IRON (Fe)

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↑ 20' ↓

← 30' →

DETERMINING AREA OF APPLICATION
 $AREA = LENGTH \times WIDTH$

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FEQUENTLY CALIBRATE EQUIPMENT
 DELIVER THE CORRECT AMOUNT OF FERTILIZER

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DETERMINE NITROGEN SOURCE/RATE
GRANULE OR LIQUID FORMS OF NITROGEN (N)

Quick or Soluble	Slow or Controlled
Nitrate - N	Sulfur Coated Urea (SCU)
Ammoniacal - N	Urea - Formaldehyde
Urea-N	Ureaform
Other water-soluble N	Polymer Coated Urea (PCU) Biosolids (Note N:P ratio)
Soluble: 0.5 lb N / 1000 ft ²	Slow Release: 1 lb N / 1000 ft ²
Where it is permissible by ordinance, the following rates for soluble N and slow-released N may be applied.*	
Soluble 0.7 N / 1000 ft ²	Slow Release 2 lb N / 1000 ft ²
*FDACS Rule 5E-1.003(2) Labeling Requirements for Urban Turf Fertilizers	

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WHAT IS THE SLOW-RELEASED NITROGEN PERCENTAGE?
 Calculating SRN from the Fertilizer label

14 - 0 - 26
 % of Total N as
 Slow-Release Nitrogen (SRN) =

$\frac{7}{14} \times 100 = 50\%$

Guaranteed Analysis

TOTAL NITROGEN (N)14.00%

14.45% Urea Nitrogen (N)*

SOLUBLE POTASH (K₂O).....26.00%

SULFUR (S) Total.....19.70%

10.5% Free sulfur (S)

9.20% Combined sulfur (S)

IRON (Fe) Total.....0.96%

0.19% Water Soluble Iron (Fe)

MANGANESE (Mn) Total.....0.48%

0.1% Water Soluble Manganese (Mn)

DERIVED FROM: Polymer Coated Sulfur Coated Urea, Sulfate or Potash, Iron Oxide, Manganese Oxide.

CHLORINE (Cl) Max.....2.00%

*7.00% Slowly Available Urea Nitrogen from Polymer Coated Sulfur Coated Urea

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FERTILIZER CALCULATOR
 SLOW-RELEASE NITROGEN - 1LB/1,000 FT² RATE

Example:

	6% N	10% N	12% N	15% N	16% N
1,000 ft ²	16.5 lbs	10 lbs	8.25 lbs	6.5 lbs	6.25 lbs
1,200 ft ²	20	12	10	8	7.5
1,500 ft ²	25	15	12.5	10	9.25
2,000 ft ²	33.25	20	16.5	13.25	12.5
2,500 ft ²	41.5	25	20.75	16.5	15.5
3,000 ft ²	50	30	25	20	18.75

Big-O-Bag Fertilizer™ 16-0-8

70% Quick/Soluble N

30% Slow/Insoluble N

1 lb. constant

$100 \div 16 = 6.25 \text{ lbs.}$

% N

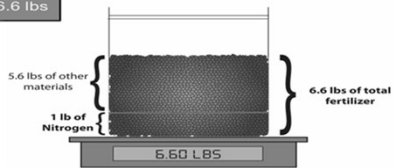
Total fertilizer to get 1 lb N

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HOW MUCH FERTILIZER PER 1,000 ft²
SLOW-RELEASE NITROGEN - 1LB/1,000 FT² RATE

Example: 15-0-15

$100 \div 15 = 6.6 \text{ lbs}$

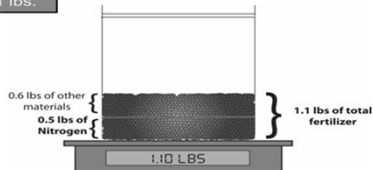


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HOW MUCH FERTILIZER PER 1,000 FT²
QUICK RELEASE NITROGEN-NO MORE THAN 0.5 LB/1,000 FT²

Example: 46-0-0

$50 \div 46 = 1.1 \text{ lbs}$




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RECOMMENDED FERTILIZER
RATES

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Determining Fertilization Rates for Florida





UF/IFAS Florida Zones

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FERTILIZER ORDINANCE APP

<https://fl.ifas.ufl.edu/fertilizer/>

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Nitrogen recommendations (lbs. N / 1,000 ft ² / year)*			
TURFGRASS	NORTH	CENTRAL	SOUTH
Bahiagrass	1-2	1-2	1-2
Bermudagrass	3-5	4-6	5-7
Centipedegrass	0.4-2	0.4-3	0.4-3
St. Augustinegrass	2-4	2-5	4-6
Zoysiagrass	2-3	2-4	2.5-4.5

*Suggested rates based on years of nitrate leaching and turf health research

RECOMMENDED RATES FOR FLORIDA

Rate and timing of N fertilization depends on the turfgrass species, season of the year, level of maintenance desired, source of N applied, and location in the state.

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Maintenance Level	Lbs. N / 1,000 ft ² / yr
Basic	0-2
Moderate	2-4

**ANNUAL FERTILIZER
RECOMMENDATIONS FOR
ESTABLISHED LANDSCAPE PLANTS**

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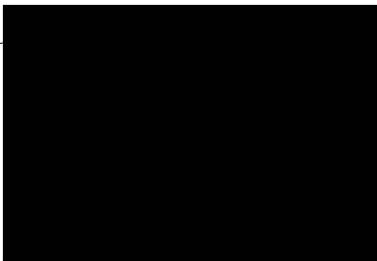
**PALMS HAVE
SPECIAL NEEDS**

- Use an 8-2-12-4 palm-special fertilizer
- Fertilization of field-grown and landscape palms in Florida
<http://edis.ifas.ufl.edu/EP261>
- Nutrient deficiencies of landscape and field-grown palms in Florida
<http://edis.ifas.ufl.edu/EP273>



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FERTILIZER APPLICATION AND HANDLING



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REVIEW TRAINING OBJECTIVES

1. Define fertilizer and terms associated with fertilizers.
2. Interpret and apply the information on a fertilizer label.
3. Calculate the amount of fertilizer to be applied according to the recommended rates.
4. Apply recommended rates.
5. Implement practices to avoid runoff and leaching of fertilizers.



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Thank You

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Florida-Friendly Landscaping PROGRAM



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Fertilizer Worksheet

Use the Fertilizer Label to Calculate Appropriate Rates and Applications

20-0-10

14.00% N 30% P 7.00% K

1000 lbs

Step 1: 1000 lbs ÷ 14.00% N = 71,428.57 lbs of Fertilizer Product

Step 2: 71,428.57 lbs ÷ 1000 lbs = 71.43 lbs of Fertilizer Product

Step 3: 71.43 lbs ÷ 1000 lbs = 0.07143 lbs of Fertilizer Product

Step 4: 0.07143 lbs ÷ 1000 lbs = 0.00007143 lbs of Fertilizer Product

Step 5: 0.00007143 lbs ÷ 1000 lbs = 0.00000007143 lbs of Fertilizer Product

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